

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	DFCS	sig	<i>Steve M. Hadfield</i> , 06, 22 MAR 12	6			
2	DFER	approve	<i>Cum Civ</i> 22 MAR 12	7			
3	DFCS	action	Steve Hadfield	8			
4				9			
5				10			

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
Steve Hadfield, Civ	DFCS	333-7474	smh	
SUBJECT Clearance for Material for Public Release				DATE 20120321
USAFA-DF-PA-201				

SUMMARY

1. PURPOSE. To provide security and policy review on the document at Tab 1 prior to release to the public.

2. BACKGROUND.

Author: Steve Hadfield

Title: Integrating Security and Software Assurance Concepts and Mindsets in an Undergraduate Computer Science Curriculum

Circle one: Abstract Tech Report Journal Article Speech Paper Presentation Poster

Thesis/Dissertation Book Other: _____

Check all that apply (For Communications Purposes):

☐ CRADA (Cooperative Research and Development Agreement) exists

☐ Photo/ Video Opportunities ☐ STEM-outreach Related ☐ New Invention/ Discovery/ Patent

Description: Invited talk at the Software Assurance Forum, Mclean, VA

Release Information:

Previous Clearance information: (If applicable): N/A

Recommended Distribution Statement: (Distribution A, Approved for public release, distribution unlimited.)

3. DISCUSSION. None.

4. VIEWS OF OTHERS. The Department Research Director has reviewed this paper and recommends it for public release.

5. RECOMMENDATION. Sign coord block above indicating document is suitable for public release. Suitability is based solely on the document being unclassified, not jeopardizing DoD interest, and accurately portraying official policy.



STEVEN M. HADFIELD
Associate Professor

1 Tab
Presentation for approval

Integrating Software Assurance and Secure Programming Concepts and Mindsets into an Undergraduate Computer Science Program

*Striving to Achieve the Goals of the
SEI/CERT Software Assurance Curriculum Project (Undergraduate)*

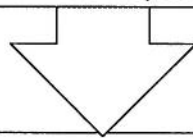


Steve Hadfield

U.S. Air Force Academy, Department of Computer Science

Realization

In an outcome-based curriculum,
some outcomes need to be purposefully developed across
courses and years.



Result

A retrospective, outcome-based look at an existing
curriculum (Felder & Brent)

Key Cross Curricular Initiative

Software Engineering Discipline	<ul style="list-style-type: none"> Needs Analysis, Requirements Elaboration, Design Testing Rigor, Quality Assurance
Ethical, Legal, Social Issues	<ul style="list-style-type: none"> Moral Frameworks & Decision Making Ethical Codes (IEEE, ACM, Software Engineering)
Research Skills	<ul style="list-style-type: none"> Literature Review, Framing/Scoping Topics, Hypotheses Investigation, Support of Conclusion, Reporting
Communications Skills	<ul style="list-style-type: none"> Oral Presentations Written Communications
Team Work	<ul style="list-style-type: none"> Team Building, Team Maintenance Pair Programming, Four-Five Member Team Dynamics
Security & Software Assurance	<ul style="list-style-type: none"> Secure Programming Cyber Security

Security & Software Assurance

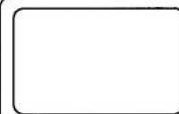
SEI/CERT SwA Curriculum		USAFA Computer Science	
<input type="checkbox"/>	Computer Science I	<input type="checkbox"/>	Computer Science I
<input type="checkbox"/>	Computer Science II	<input type="checkbox"/>	Computer Science II
<input type="checkbox"/>	Intro to Computer Security	<input type="checkbox"/>	Computer Security & Information Warfare
<input type="checkbox"/>	Software Security Engineering		
<input type="checkbox"/>	Software Quality Assurance		
<input type="checkbox"/>	Software Assurance Analytics	<input type="checkbox"/>	Software Engineering I
<input type="checkbox"/>	Software Assurance Capstone	<input type="checkbox"/>	Software Engineering II

Security & Software Assurance Initiative Sophomore Year



Computer Science I - Intro to Programming

- Input interpretation validation, array bounds checking
- Integer overflow, error/exception handling, file I/O issues



Computer Science II – Data Abstraction

- Pre- and post-conditions, more advanced debugging
- Testing & debugging techniques, reinforce CS I topics



Computer Organization & Architecture

- Data type overflow, divide-by-zero, round-off error
- Stack overflows

Security & Software Assurance Initiative Junior Year



Programming Paradigms

- Memory allocation/deallocation, termination conditions
- Stack/buffer overflows and protections, type safety



Operating Systems

- Deadlock issues, race conditions, system calls
- Signals, file system security



Databases & Web Programming

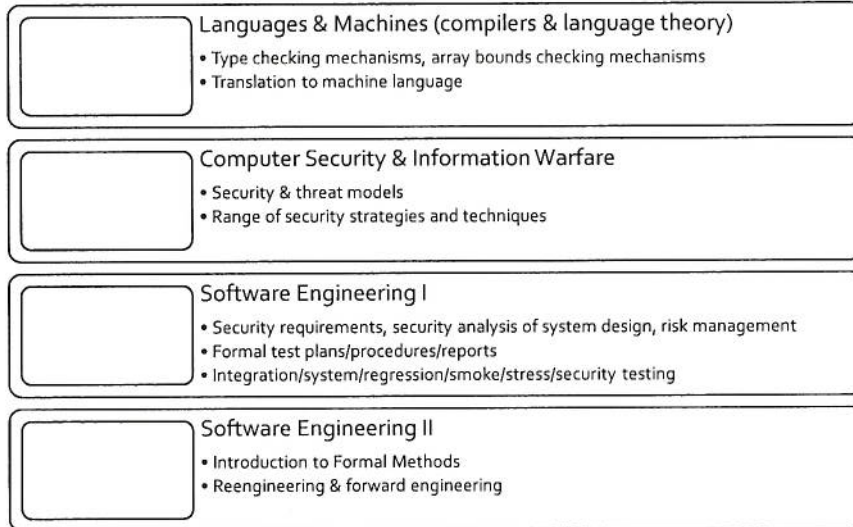
- Defense against SQL injection attacks
- Cross site scripting attacks



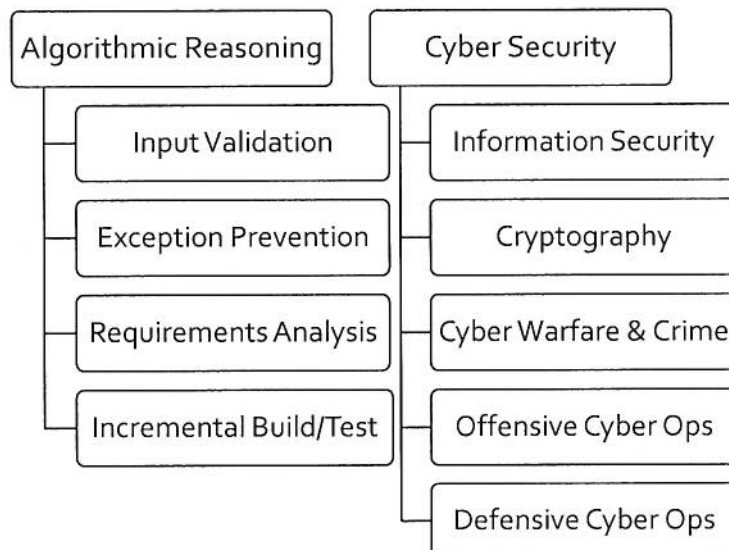
Networks

- Secure protocols, wireless encryption, Man-in-the-Middle attacks
- Adversarial view of protocols, network access control

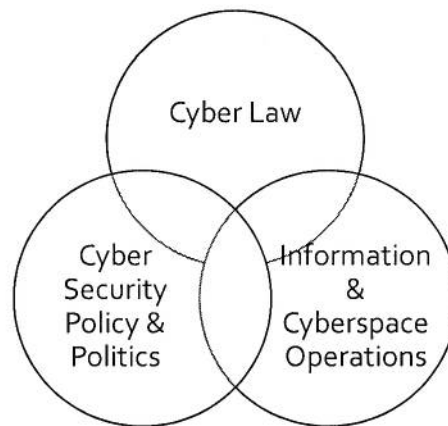
Security & Software Assurance Initiative Senior Year



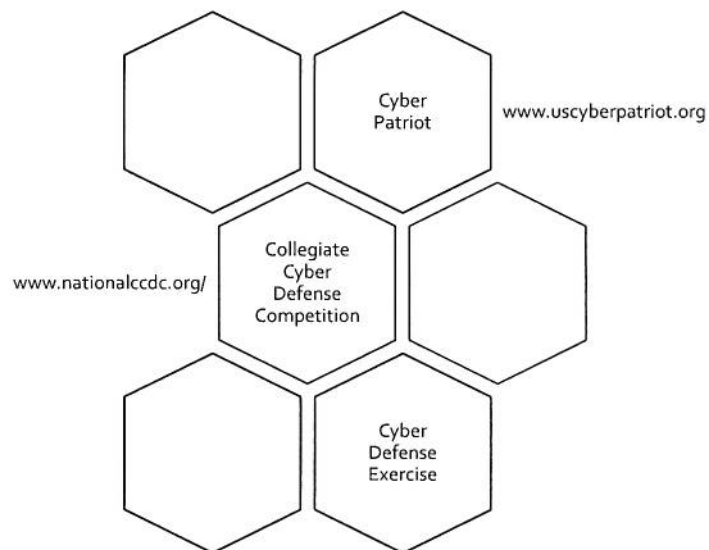
Software Assurance & Security for ALL



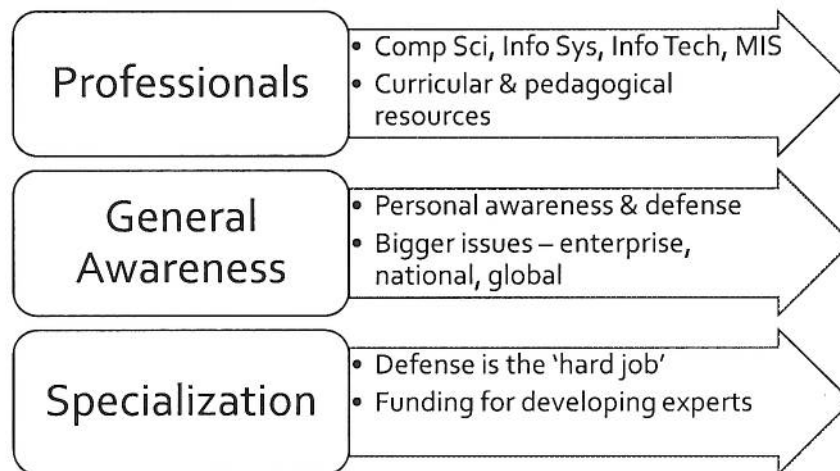
Enrichment Activities Interdisciplinary Courses



Enrichment Activities Defensive Competitions



Vectors



Questions?



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